REMARKS

Claims 1-23 are pending in this application and were rejected. Applicants are amending claims 1, 5, 6, 11, 16, 17, 18, 22, and 23 to address the rejections and adding new claims 24-25. In view of the foregoing amendments and following remarks, Applicants hereby respectfully request reconsideration of the Application. A marked-up version of the amended claims is provided in the Appendix.

Rejection Under 35 U.S.C. §102

In paragraph 2 of the Office Action, the Examiner rejected claims 1, 16, and 18-22 as being anticipated by U.S. Patent No. 1,711,653 to *Quarles*. Applicants respectfully traverse.

Applicants have amended claims 1, 16, and 22. Amended claim 1 now recites,

> A load coil for insertion along a local loop, the load coil comprising: a coupled inductor having first and second windings ... a first capacitive element ... and a second capacitive element ... the first capacitive element and the second capacitive element **having capacitances that are selected based upon an inter-winding capacitance between the first winding and the second winding** ... (emphasis added).

Amended claim 16 now recites,

> A load coil coupled to a local loop ... the load coil comprising: inductive means ... and capacitive means **having capacitances based upon a capacitance of the inductive means**, the capacitive means coupled to the inductive means ... (emphasis added).

Amended claim 22 now recites,

> A system to improve simultaneous transmission of POTS-band signals and DSL signals across a local loop, the system comprising: a first local loop ... a second local loop ... a coupled inductor ... including ... a first inductor winding ... a second inductor winding ... and capacitive elements ... including a first capacitor ... and a second capacitor ... the first capacitor and the second capacitor **having capacitances that are selected based upon an inter-winding capacitance between the first inductor winding and the second inductor winding** (emphasis added).

Applicants submit that amended claims 1, 16, and 22 recite no new matter. In support of amended claims 1, 16, and 22 the specification states, page 13, lines 15-17,

> In one embodiment, the capacitors 320 and 322 each have a capacitance of at least about five times, and preferably at least about 10 times the **inter-winding capacitance** of each of the windings 302 and 304 (emphasis added).

In contrast, *Quarles* discloses a loading unit 5 (FIG. 1) comprising inductance coils 7 (FIG. 1) of equal inductance and two condensers 8 (FIG. 1) of equal capacity, the effective inductance of which is a variable quantity depending on the frequency of the transmitted waves (page 1, lines 66-70 and lines 96-100). Furthermore, capacitive values for the two condensers 8 are selected based upon a total capacitance measured between the wires comprising each section of line (FIG. 1, 6) to contribute to the effective inductance of the loading unit 5 (claim 3). *Quarles* states, in claim 3,

> A two-wire transmission line comprising a plurality of equal sections divided by inductive loading units, said units comprising an inductance having equal windings ... and a capacity ... said capacity having a value between .4 and .8 of the total capacity **between the wires** of one of said sections (emphasis added).

The value of said capacity is significant to *Quarles*' system, since said capacity contributes to the variable effective inductance of the loading unit 5. For example, *Quarles* discloses that the effective inductance of a network equivalent (FIG. 3) of the loading unit 5 is $L_e = L/(1 + 1/(2p^2LC))$, where C is a capacitance of the condenser 8, L is an inductance of the inductance coil 7, and p is the angular velocity (page 2, lines 96-102, and Equation (1)). Since *Quarles'* system is designed to use the variable effective inductance of the loading unit 5 to correct for transient distortion of POTS signals over each section of line 6, which depends upon lengths of each section of line 6, it is not surprising that *Quarles* chooses capacitive values for condensers 8 based upon the total capacitance measured **between the wires comprising each section of line**

6, and thus the capacitive values for condensers 8 **depend upon a length** of each section of line 6. In fact, the Examiner acknowledges that *Quarles* teaches capacitive values for the condensers 8 based upon "the capacitance of a loop section," (Office Action, paragraph 12, lines 7-8). Furthermore, *Quarles* does not disclose that the capacitive values of condensers 8 are selected "based upon an inter-winding capacitance between the first winding and the second winding" of the inductance coils 7. In fact, *Quarles* does not disclose that the capacitive values of condensers 8 are selected based upon any capacitance associated with the inductance coils 7.

Based on at least the above remarks, Applicants submit that amended claims 1, 16, and 22 are not anticipated by *Quarles*, and respectfully request that amended claims 1, 16, and 22 be allowed.

In paragraph 5 with regard to claim 18, the Examiner stated that "recitation of intended use in the claim carries no weight since the loading system disclosed by Quarles **inherently** possesses the properties that condition the POTS-band signals ... and pass the DSL signals ... with low attenuation" (emphasis added). Applicants respectfully submit that whether or not *Quarles* inherently possesses properties of the Applicants' invention as claimed is not the point. Claim 18 is a method claim, not a system claim, and *Quarles* does not disclose a method that conditions "POTS-band signals traversing the local loop" and passes "DSL signals traversing the local loop with low attenuation" as claimed. Applicants fail to see how the method of the claimed invention is anticipated by *Quarles*, since *Quarles* does not disclose the method as claimed. However, Applicants have amended claim 18 to include an additional limitation similar to amended claim 16. Amended claim 18 now recites,

> A method for improving simultaneous transmission of POTS-band signals and DSL signals across a local loop, comprising the steps of: inductively coupling a first segment of the local loop to a second segment of the local loop via a coupled inductor ... and capacitively coupling the first segment of the local loop to the second segment of the local loop via capacitive elements to pass the DSL signals traversing the local loop with

low attenuation, the capacitive elements **having capacitances that are selected based upon a capacitance of the coupled inductor** (emphasis added).

Therefore, based on at least the above remarks in conjunction with amended claims 1, 16, and 22, Applicants submit that amended claim 18 is not anticipated by *Quarles* and respectfully request that amended claim 18 be allowed.

Furthermore, since claims 19-21 depend from claim 18, Applicants submit that they are allowable for at least the same reasons, and respectfully request that the rejections of claims 19-21 be withdrawn.

Rejection under 35 U.S.C. §103

In paragraph 11 of the Office Action, the Examiner rejected claims 2, 3, and 5 under 35 U.S.C. §103(a) as being unpatentable over *Quarles* in view of *Federal Telephone and Radio Corporation*. Applicants respectfully traverse.

First, Applicants have amended claim 5 to be consistent with amended claim 1. Amended claim 5 now recites,

> The load coil of claim 1, wherein the first and second capacitive elements increase an effective inter-winding capacitance of the first and second windings by at least a factor of 5.

Second, as discussed above in conjunction with claims 1, 16, and 22, *Quarles* chooses capacitive values for condensers 8 based upon the total capacitance measured **between the wires comprising each section of line 6**, and thus the capacitive values for condensers 8 **depend upon a length** of each section of line 6. Specifically, *Quarles* discloses that the capacitive values (i.e., capacitance) have a value between .4 and .8 of the total capacity between the wires of one section of line 6 (claim 3). The Examiner computed a range of capacitances (17 nF – 34 nF)

based upon *Quarles'* disclosed capacitive values, a capacitance of a mile of 24 AWG telephone transmission line as taught by *Federal Telephone and Radio Corporation*, and a 6,000 foot loop section of line. With regard to claims 2-3, the Examiner stated that "[i]t would have been obvious ... to utilize the published values for transmission line capacitance to calculate the capacitances taught by Quarles for the purpose of implementing Quarles's invention" (paragraph 12, lines 12-15, and paragraph 13, lines 6-9). With regard to claim 5, the Examiner stated that "it is inherent in the values taught by Quarles and Federal Telephone and Radio Corporation that they increase the effective interwinding capacitance of the inductor windings by at least a factor of 5" (paragraph 14, lines 6-8).

The range of capacitances (17 nF – 34 nF) computed by the Examiner is not based upon an inter-winding capacitance between the first winding and the second winding of a coupled inductor as recited in claim 1, but instead is dependent upon a length of section of line and the capacitance between the two wires comprising the section of line. Applicants submit that if the range of capacitances (17 nF – 34 nF) computed by the Examiner are similar to the range of capacitances of the first and second capacitive elements as claimed, then this similarity is purely coincidental, since the capacitances of the first and second capacitive elements of claim 1 are based upon a different set of criteria than the capacitances computed by the Examiner.
Based on at least the above remarks, and based upon claims 2, 3, and 5 being dependent from claim 1, Applicants submit that the combination of *Quarles* and *Federal Telephone and Radio Corporation* does not teach or suggest all of the limitations of claims 2, 3, and 5, and respectfully request that claims 2, 3, and 5 be allowed.

In paragraph 15 of the Office Action, the Examiner rejected claim 4 under 35 U.S.C. §103(a) as being unpatentable over *Quarles* in view of *Baker*. The Examiner stated, paragraph

15, lines 5-6, "Baker discloses that 66 mH is one of the two most commonly used values for inductors used as loading coils...." In addition, the Examiner stated, paragraph 15, lines 7-9, "[i]t would have been obvious ... to use a load coil with a common inductance value in the system disclosed by Quarles ...." Applicants respectfully traverse and submit that combining the primary and secondary references do not overcome the deficiencies of the primary reference. Based at least on the above remarks directed to amended claims 1, 16, and 22, Applicants submit that the combination of *Quarles* and *Baker* does not teach or suggest all of the limitations of claim 4 and respectfully request that claim 4 be allowed.

In paragraph 16 of the Office Action the Examiner rejected claims 6-8, 10, and 23 as being unpatentable over U.S. Patent No. 761,995 to *Pupin* in view of U.S. Patent No. 3,476,883 to *Birck* and further in view of well known prior art. Applicants respectfully traverse. Applicants have amended claims 6 and 23. Amended claim 6 now recites,

> A load coil for insertion along a local loop, the load coil comprising: a coupled inductor having first and second windings ... a first capacitive element disposed in parallel with the first winding; and a second capacitive element disposed in parallel with the second winding, the first capacitive element and the second capacitive element **having capacitances that are selected based upon an intra-winding capacitance of either the first winding or the second winding** ... (emphasis added).

Amended claim 23 now recites,

> A system to improve simultaneous transmission of POTS-band signals and DSL signals across a local loop, the system comprising: a first local loop ... a second local loop ... a coupled inductor ... including an inductor core, a first inductor winding ... a second inductor winding ... and capacitive elements ... including a first capacitor ... and a second capacitor ... the first capacitor and the second capacitor **having capacitances that are selected based upon an intra-winding capacitance of either the first inductor winding or the second inductor winding** (emphasis added).

Applicants submit that the combination of *Pupin* and *Birck* and the well known prior art does not teach all the limitations of amended claims 6 and 23. Specifically the amended claim 6

limitation of "having capacitances that are selected based upon an intra-winding capacitance of either the first winding or the second winding," and the amended claim 23 limitation of "having capacitances that are selected based upon an intra-winding capacitance of either the first inductor winding or the second inductor winding" are not suggested or taught by the combination.

Based on at least the above remarks, Applicants respectfully submit that *Pupin* in view of *Birck* and further in view of the well known prior art does not teach all of the limitations of claims 6 and 23 as amended, and request that amended claims 6 and 23 be allowed.

Since claims 7-10 depend from amended claim 6, Applicants submit that they are allowable for at least the same reasons. Furthermore, in regard to claim 9, the combination of *Pupin* in view of *Birk* and further in view of the well known prior art and further in view of *Baker* does not remedy the deficiencies of the primary reference. Therefore, Applicants respectfully request that the rejections of claims 7-10 be withdrawn.

In paragraph 23, the Examiner rejected claim 17 as being unpatentable over *Quarles* in view of *Vittore*. Applicants respectfully traverse with regards to amended claim 17. Amended claim 17 now recites,

> A system for transmitting DSL and POTS signals over a local loop, the system comprising: load coil means positioned along the local loop, the load coil means comprising inductive means for conditioning POTS signals as they traverse the local loop and capacitive means **having capacitances based upon a capacitance of the inductive means** coupled to the inductive means for facilitating passage of DSL signals across the load coil; and DSL signal amplification means positioned along the local loop for amplifying DSL signals as they traverse the local loop (emphasis added).

Amended claims 17 and 16 are similarly limited by the phrase "capacitive means having capacitances based upon a capacitance of the inductive means." Therefore, based on at least the above remarks in conjunction with the above discussion regarding amended claim 16, Applicants respectfully submit that *Quarles* does not teach all the elements of the load coil means, and the

further combination of *Quarles* with *Vittore* does not remedy the deficiencies of the primary reference. Applicants respectfully request that the rejection of claim 17 be withdrawn.

In paragraph 24 of the Office Action, the Examiner rejected claims 11 and 13-15 as being unpatentable over *Pupin* in view of *Birck* and further in view of well known prior art and further in view of *Vittore*. Applicants respectfully traverse. Applicants are amending claim 11. Amended claim 11 now recites,

> A system for transmitting DSL and POTS signals over a local loop, the system comprising: a first load coil for disposal along the local loop to condition the POTS signals, the first load coil including a coupled inductor and multiple capacitive elements for increasing an effective capacitance of the coupled inductor to improve transmission of DSL signals across the first load coil, the multiple capacitive elements **having capacitances that are selected based upon a capacitance of the coupled inductor**; and a first DSL signal repeater for disposal along the local loop in series with the first load coil to amplify the DSL signals, the first DSL signal repeater including a second load coil for conditioning POTS signals passing therethrough (emphasis added).

Applicants submit that the combination of *Pupin* and *Birck* and the well known prior art does not teach all the limitations of amended claim 11, specifically the limitation of "having capacitances that are selected based upon a capacitance of the coupled inductor." Applicants respectfully submit that even if it would have been obvious to utilize the frequency selective DSL amplifier disclosed by *Vittore* as *Birk's* frequency selective device 39 (FIG. 1C), the combination of *Vittore* with the other references does not remedy the deficiencies of the other references. Applicants respectfully request that amended claim 11 be allowed.

Since claims 12-15 depend from amended claim 11, Applicants submit that they are allowable for at least the same reasons. Furthermore, in regard to claim 12, the combination of *Pupin* in view of *Birk* and further in view of well known prior art and further in view of *Vittore* and further in view of *Quarles* does not remedy the deficiencies of the primary reference. Therefore, Applicants respectfully request that the rejections of claims 12-15 be withdrawn.

New Claims

Applicants are adding new claims 24-25. Applicants submit that claims 24-25 introduce no new matter.

Conclusion

Based on the foregoing remarks, Applicants believe that the rejections in the Office Action of September 4, 2002 are fully overcome and that the application is in condition for allowance. If the Examiner has any questions regarding the case, the Examiner is invited to contact Applicants' undersigned representative at the number given below.

Respectfully submitted,

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APPENDIX

In the claims:

1. (Twice Amended) A load coil for insertion along a local loop, the load coil comprising:

a coupled inductor having first and second windings wrapped about an inductor core, each winding having an input and an output, the coupled inductor configured to counteract a parallel capacitance of the local loop to improve transmission of POTS-band signals across the local loop;

a first capacitive element disposed between the input of the first winding and the input of the second winding; and

a second capacitive element disposed between the output of the first winding and the output of the second winding, the first capacitive element and the second capacitive element having capacitances that are selected based upon an inter-winding capacitance between the first winding and the second winding [configured] to permit passage of DSL signals across the load coil.

5. (Twice Amended) The load coil of claim 1, wherein [the first and second windings have an inter-winding capacitance and] the first and second capacitive elements increase [the] an effective inter-winding capacitance of the first and second windings by at least a factor of 5.

6. (Twice Amended) A load coil for insertion along a local loop, the load coil comprising:

a coupled inductor having first and second windings wrapped about an inductor core, each winding having an input and an output, the coupled inductor configured to improve transmission of POTS-band signals across the local loop;

a first capacitive element disposed in parallel with the first winding; and

a second capacitive element disposed in parallel with the second winding, the first capacitive element and the second capacitive element having capacitances that are selected based upon an intra-winding capacitance of either the first winding or the second winding [configured] to permit passage of DSL signals across the load coil with low attenuation.

11. (Once Amended) A system for transmitting DSL and POTS signals over a local loop, the system comprising:

a first load coil for disposal along the local loop to condition the POTS signals, the first load coil including a coupled inductor and multiple capacitive elements for increasing an effective capacitance of the coupled inductor to improve transmission of DSL signals across the first load coil, the multiple capacitive elements having capacitances that are selected based upon a capacitance of the coupled inductor; and

a first DSL signal repeater for disposal along the local loop in series with the first load coil to amplify the DSL signals, the first DSL signal repeater including a second load coil for conditioning POTS signals passing therethrough.

16. (Twice Amended) A load coil coupled to a local loop for improving simultaneous transmission of POTS and DSL signals across the local loop in any direction, the load coil comprising:

inductive means for conditioning the POTS signals as they traverse the local loop; and

capacitive means having capacitances based upon a capacitance of the inductive means, the capacitive means coupled to the inductive means for permitting the DSL signals to pass across the load coil.

17. (Once Amended) A system for transmitting DSL and POTS signals over a local loop, the system comprising:

load coil means positioned along the local loop, the load coil means comprising inductive means for conditioning POTS signals as they traverse the local loop and capacitive means having capacitances based upon a capacitance of the inductive means coupled to the inductive means for facilitating passage of DSL signals across the load coil; and

DSL signal amplification means positioned along the local loop for amplifying DSL signals as they traverse the local loop.

18. (Once Amended) A method for improving simultaneous transmission of POTS-band signals and DSL signals across a local loop, comprising the steps of:

inductively coupling a first segment of the local loop to a second segment of the local loop via a coupled inductor to condition the POTS-band signals traversing the local loop; and

capacitively coupling the first segment of the local loop to the second segment of the local loop via capacitive elements to pass the DSL signals traversing the local loop with low attenuation, the capacitive elements having capacitances that are selected based upon a capacitance of the coupled inductor.

22. (Once Amended) A system to improve simultaneous transmission of POTS-band signals and DSL signals across a local loop, the system comprising:

a first local loop, the first local loop including

a first wire, and

a second wire;

a second local loop, the second local loop including

a third wire, and

a fourth wire;

a coupled inductor configured to condition the POTS-band signals traversing the first and second local loops, the coupled inductor including

an inductor core,

a first inductor winding wrapped about the inductor core and coupling the first wire to the third wire, and

a second inductor winding wrapped about the inductor core and coupling the second wire to the fourth wire; and

capacitive elements configured to pass the DSL signals traversing the first and second local loops, the capacitive elements including

a first capacitor coupling the first wire to the fourth wire, and

a second capacitor coupling the second wire to the third wire, the first capacitor and the second capacitor having capacitances that are selected based upon an inter-winding capacitance between the first inductor winding and the second inductor winding.

23. (Once Amended) A system to improve simultaneous transmission of POTS-band signals and DSL signals across a local loop, the system comprising:

a first local loop, the first local loop including

a first wire, and

a second wire;

a second local loop, the second local loop including

a third wire, and

a fourth wire;

a coupled inductor configured to condition the POTS-band signals traversing the first and second local loops, the coupled inductor including

an inductor core,

a first inductor winding wrapped about the inductor core and coupling the first wire to the third wire, and

a second inductor winding wrapped about the inductor core and coupling the second wire to the fourth wire; and

capacitive elements configured to pass the DSL signals traversing the first and second local loops, the capacitive elements including

a first capacitor coupling the first wire to the third wire, and

a second capacitor coupling the second wire to the fourth wire, the first capacitor and the second capacitor having capacitances that are selected based upon an intra-winding capacitance of either the first inductor winding or the second inductor winding.